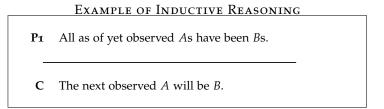
Hume's Problem of Induction March 2, 2015

Inductive Reasoning

Most of what we believe about the world we believe on the basis of *inductive reasoning*.



Are we *justified* in believing the conclusion of arguments of this form?

Notice: the conclusion doesn't *deductively follow* from the premise — it is possible for the premise to be true and the conclusion false.

The Uniformity of Nature. If nature is uniform — that is, if the
regularities that have held in the past will continue to hold in the
future — then we can turn our inductive inference into a deductively valid inference.

Note: We certainly don't think that *all* instances of this reasoning are okay. It depends on what we plug in for 'A' and 'B'. For example, we wouldn't (and shouldn't) reason from the fact that all as of yet observed hairs on my head are non-white to the conclusion that the next observed hair on my head will be non-white. Or, for example, that all as of yet observed planets have been observed that *all* planets are observed.

Uniformity of Nature

- **P1** All as of yet observed *A*s have been *B*s.
- **P2 Uniformity of Nature:** If a regularity has held in the past, it will continue to hold in the future.
- **C** The next observed A will be B.

Problem: Are we justified in believing that nature is uniform?

2. **Induction Has Always Worked So Far!** Maybe our inductive inferences are justified because they work. So far, every time we've used induction, we've been right.

Claim: All as of yet observed instances of inductive reasoning have been successful, therefore, the next observed instance of inductive reasoning will be successful.

Problem: That's circular. In order for the past success of inductive reasoning to justify our use of it on this occasion, we have to assume that inductive reasoning works.

3. Causation. Maybe we're justified in using inductive reasoning by making a causal inference.

CAUSAL INDUCTIVE ARGUMENT

- All as of yet observed As have been Bs.
- Causal Claim: There is a causal connection between something being an A and it being a B.
- The next observed *A* will be *B*.

Problem: This works only if our beliefs about causation are justified. Hume, however, is skeptical that we're justified in believing that one thing caused another.

4. Bayesian Induction. Does Bayesianism solve the problem of induction? Let $H = All \ As \ are \ B$. And let $E_i = The \ ith \ observed \ A \ is \ a$ В.

$$\Pr(H \mid E_1 \wedge \dots \wedge E_n) = \frac{\Pr(E_1 \wedge \dots \wedge E_n \mid H) \cdot \Pr(H)}{\Pr(E_1 \wedge \dots \wedge E_n)}$$
And $\Pr(H \mid E_1 \wedge \dots \wedge E_n) > \Pr(H)$.

Does this show that we're justified in making inductive inferences?

Some Extra Principles

1. The Principal Principle. "Match your degrees of belief to the objective chances!"

$$Pr(X \mid ch(X) = x) = x$$

2. The Relative Frequency Principle. "Match your degrees of belief to the relative frequencies!"

$$Pr(X \mid relFreq(X) = x) = x$$

3. The Reflection Principle. "If you know what your better informed future-self will believe, then you should believe it now!"

$$\Pr\left(X\mid \Pr^+(X)=x\right)=x$$

4. The Deference to Experts Principle. "Defer to the experts!"

$$Pr(X \mid Expert(X) = x) = x$$